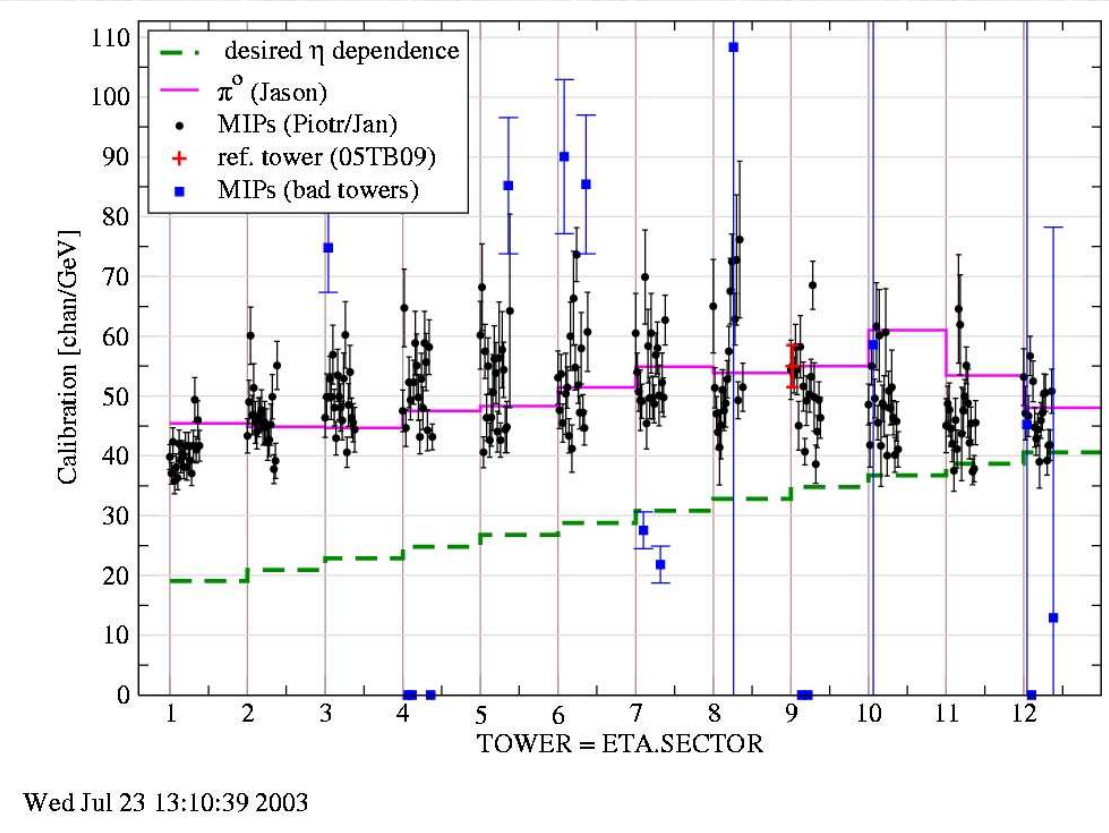
EEMC Calibration Summary from 2003 p+p Data

Three independent methods to obtain absolute calibrations.

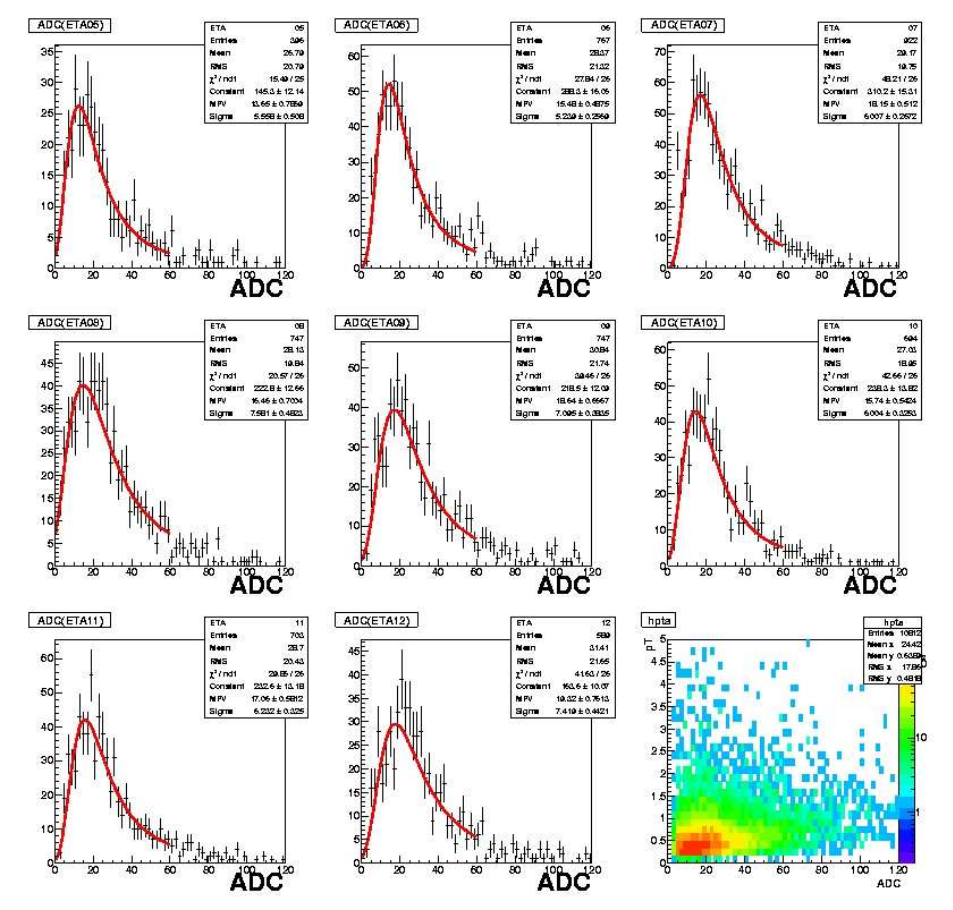
- ✔ MIP's: peak locations/slopes
- ✔ p/E of electrons using TPC tracks
- ✔ Reconstruction of π^0 mass



Relative Gains from MIPs

- For $1.1 \leq \eta \leq 1.4$, use MIP's tracked by the TPC
- MIP predicted to enter/exit given tower
- 5% sampling fraction used to convert to equivalent shower energy.

Fits to the observed peak shape determines the absolute gain of a given tower. Fit is to a Landau distribution.

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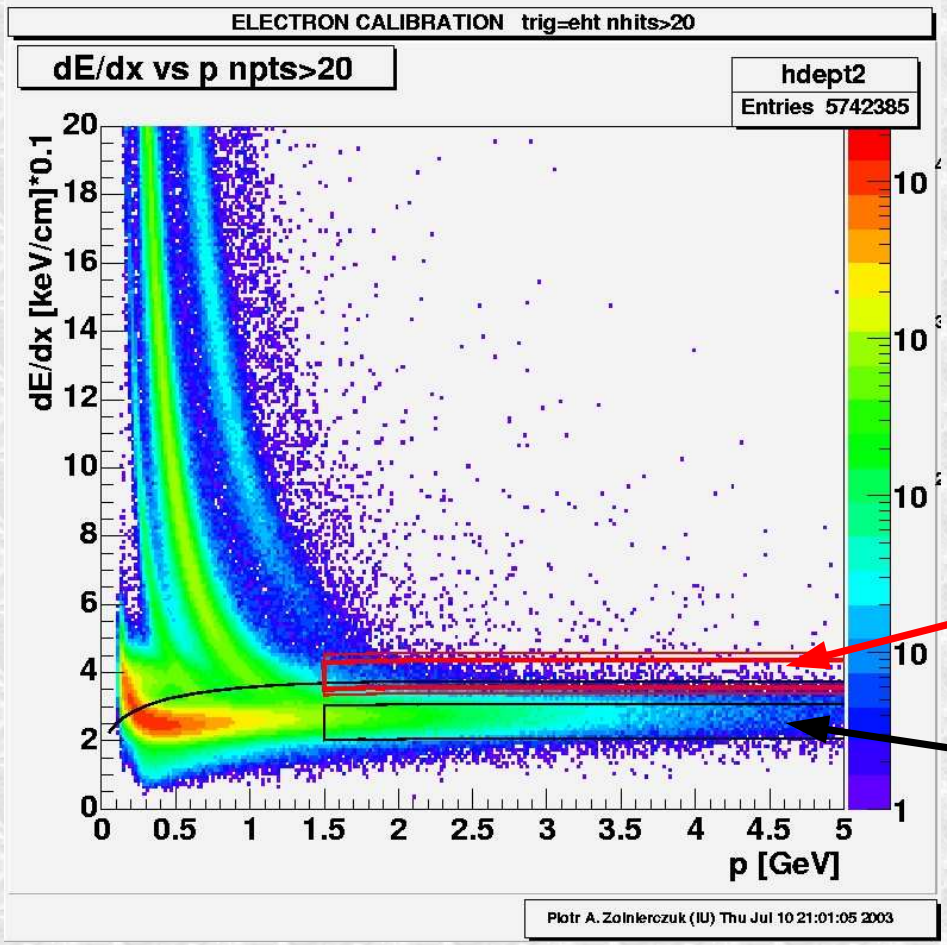
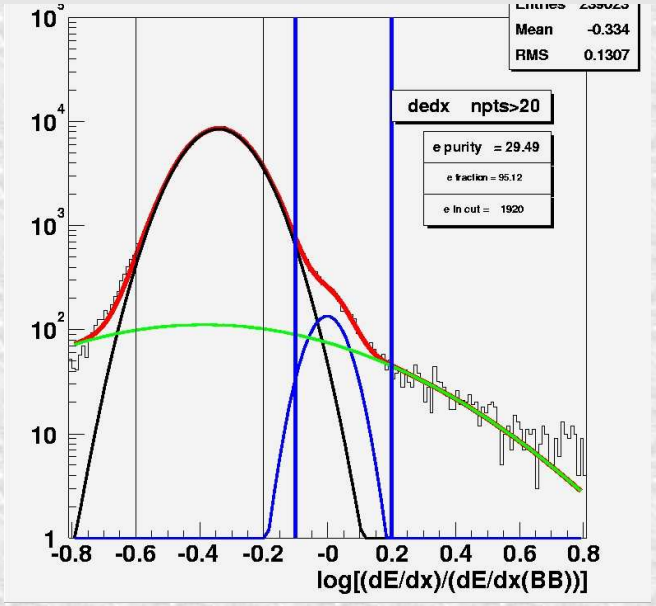
Calibration using p/E of electrons

Electrons selected using TPC dE/dx information. Relative tower gains from MIP's, absolute gains adjusted to match TPC p to EEMC E.



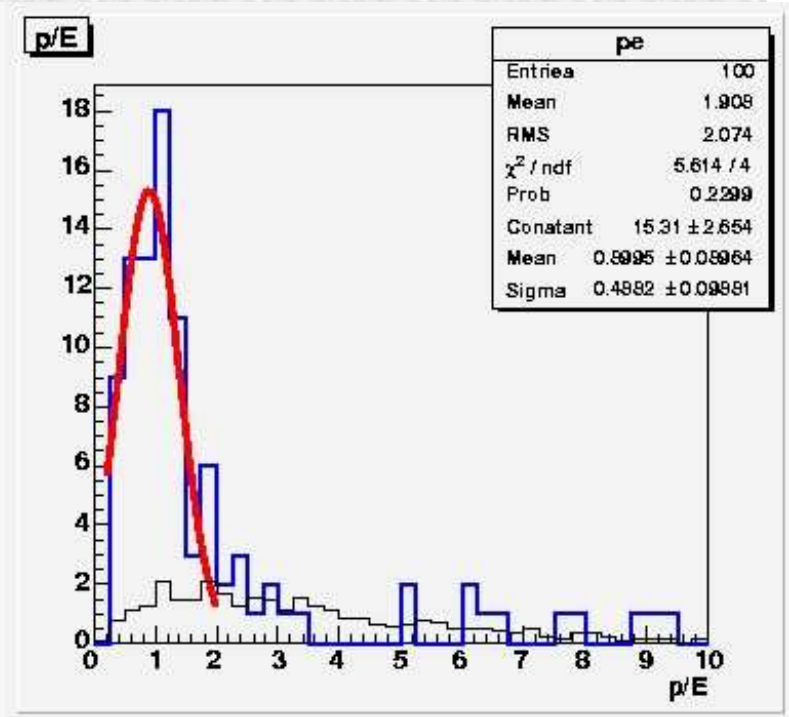
Energy-loss divided by Bethe-Bloch prediction – purities from 25-65%

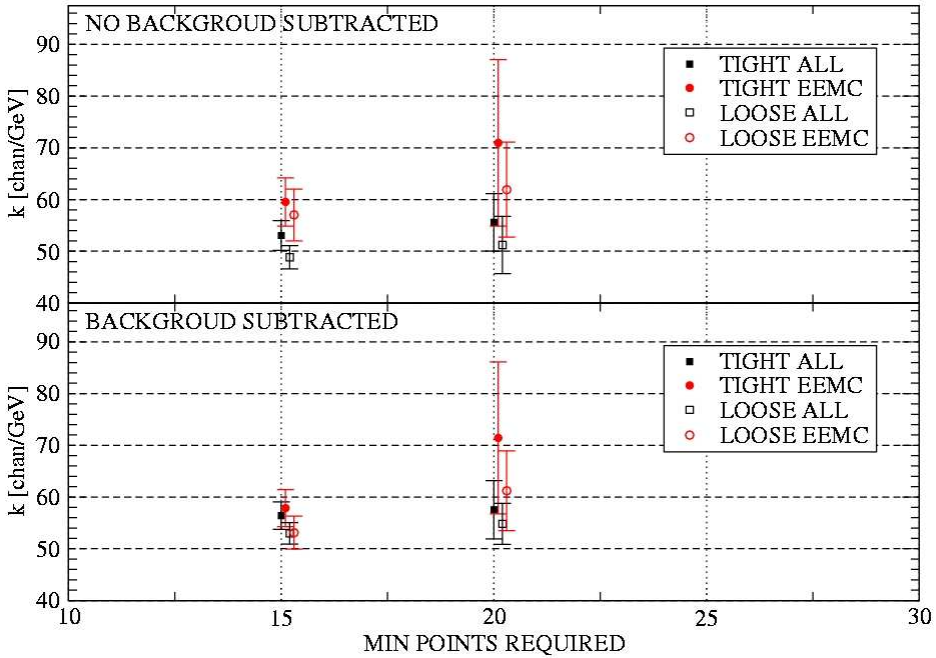


Electron candidates

Background region

Calibration using p/E of electrons

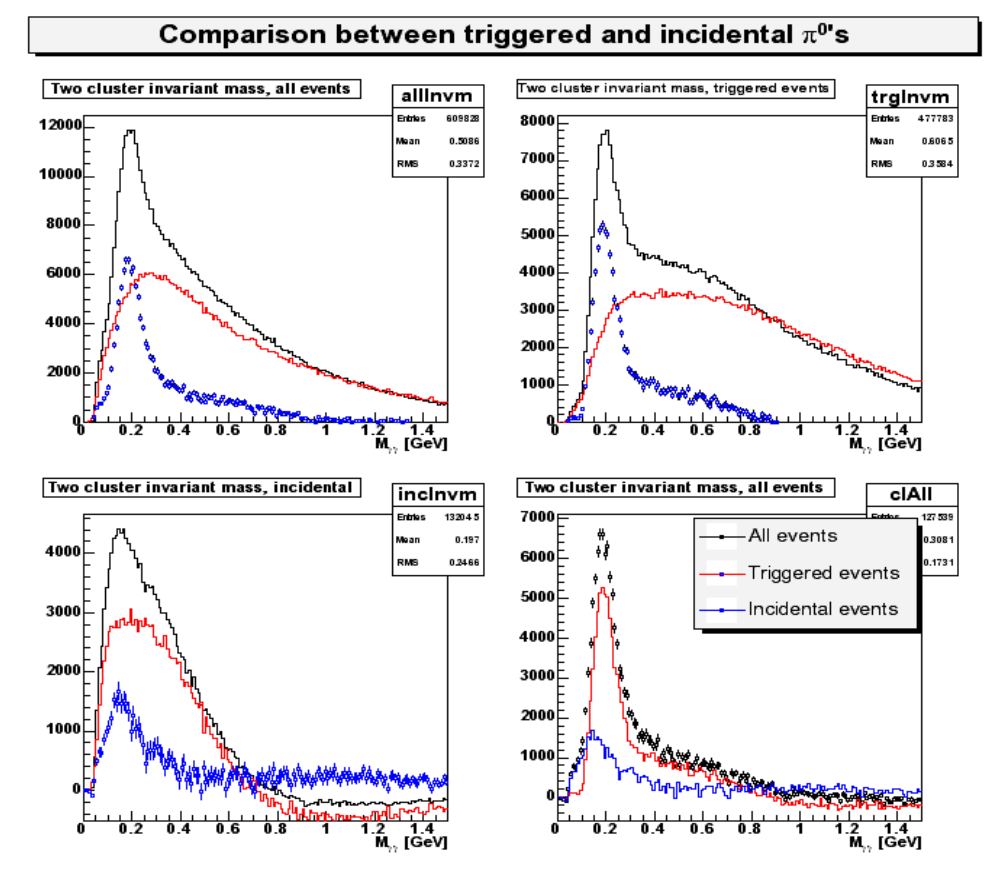




Reconstruction of π^0's

Clusters formed around "seed" towers w/ E > 0.7 GeV. Two cluster invariant mass spectra of "resolved" clusters show clear π^0 mass peak.

- 7% of EHT triggers have a p0
- Clusters which fired the trigger produce narrower peak and reduce backgrounds

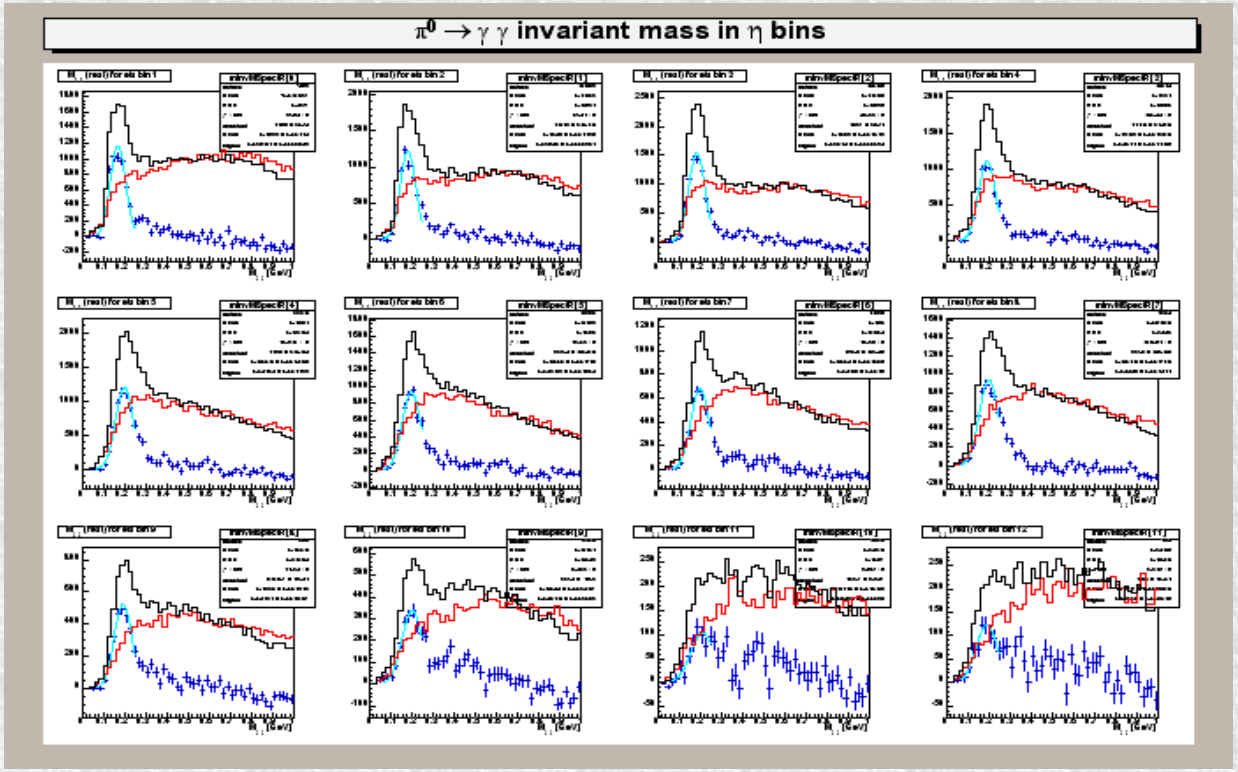


Systematic errors in the mass due to geometric effects and energy splitting of nearby clusters.

Reconstruction of π^0's

Events are sorted by the η bin of the more energetic cluster.

Gains extracted from the reconstructed mass in each η bin and the "correct" mass of the π^0... in each η bin...

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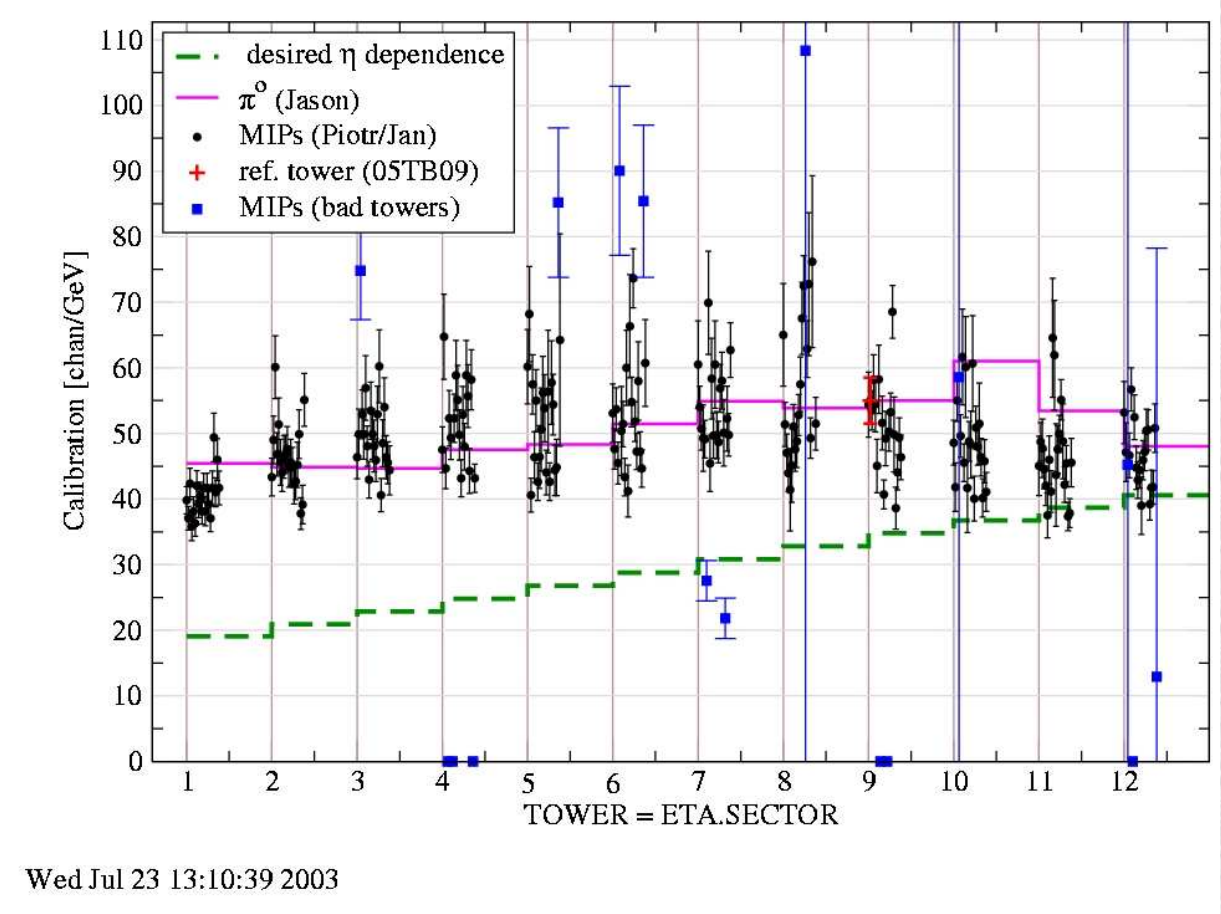
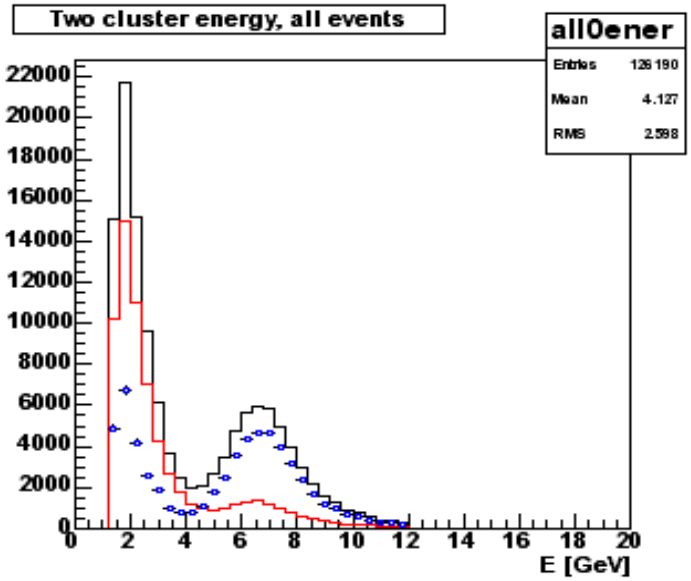
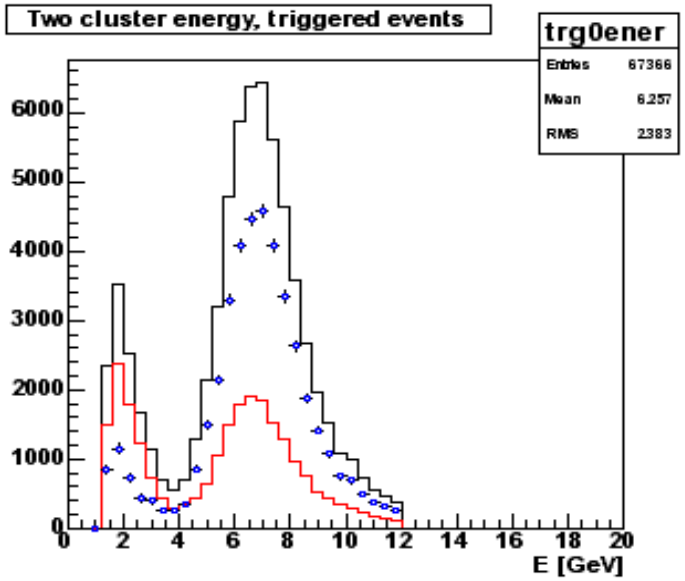
The Big Picture

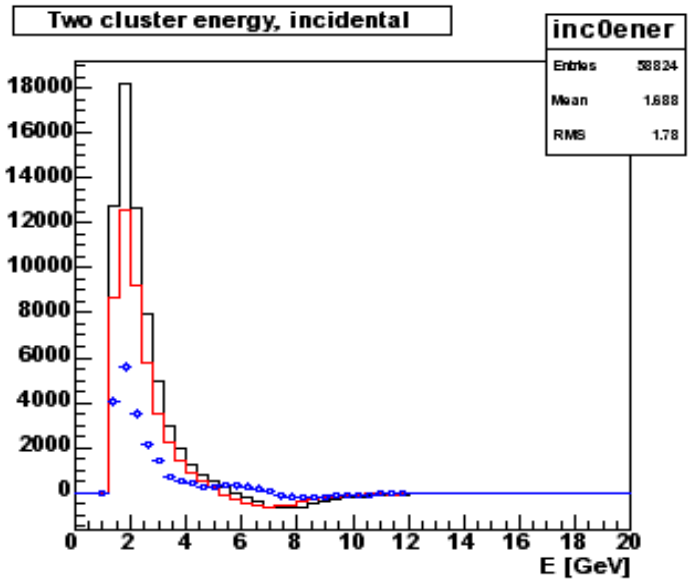
Eta dependence from MIPs and π^0's

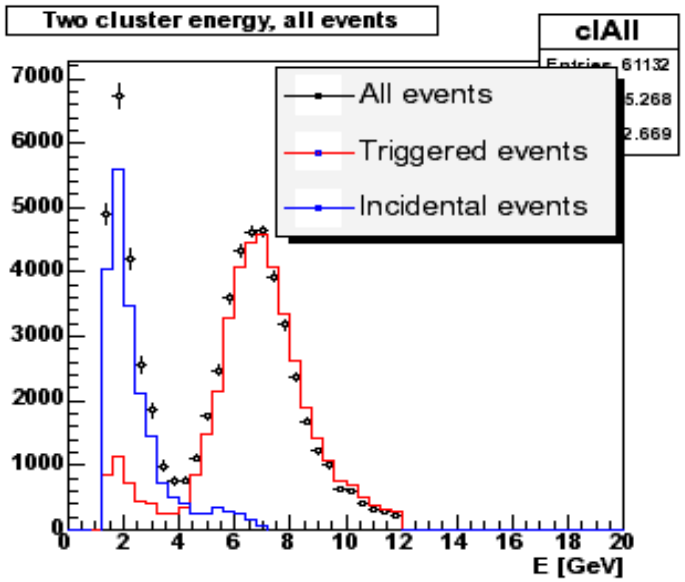


Comparison between triggered and incidental π^0's









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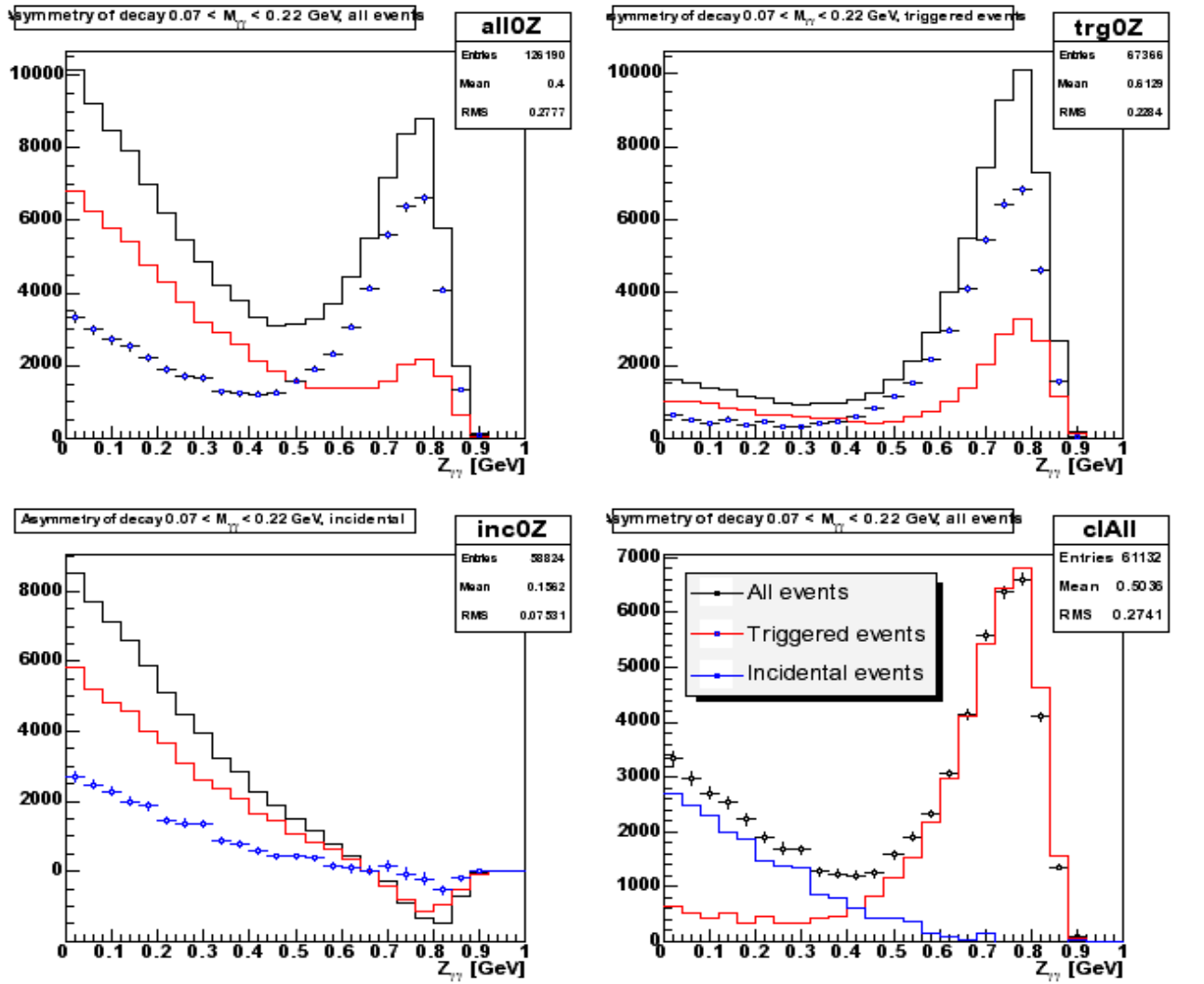

$$Z = |E_1 - E_2| / (E_1 + E_2)$$